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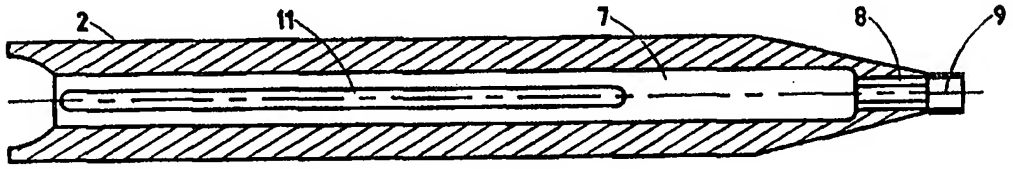

(57) Abstract

The invention relates to a device for inserting a drain into a wound with a needle having a sharp frontal end and a rear end which is provided with an attaching means for connecting the drain with the needle. The device is also provided with a handle which is detachably connectable to the rear end of the needle and which is provided with a central channel for at least partially receiving the drain. The connection between the needle and the handle may be realized by means of a polygonal rear end of the needle and a correspondingly shaped recess in the handle.

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Device for inserting a drain into a wound

The invention relates to a device for inserting a drain into a wound with a needle having a sharp frontal end and a rear end which is provided with an attaching means for connecting the drain with the needle.

With the aid of such a device a drain is drawn from the wound side through the skin to the outside. The sharp frontal end penetrates the skin and forms an opening for the drain to pass through. Next, the drain is detached from the needle and attached in a manner known in itself to an apparatus (such as a Redon bottle) for draining off wound fluid and the like.

Piercing the skin with the needle requires much strength because of the toughness of the skin. As the needle has to have a minimal diameter, in the order of the diameter of the drain to be applied, the surface of the needle forms only a small contact area, so that it becomes very difficult to exert the required force. The exertion on the needle of the required force is further hindered by the fact that the performing person (for instance, a surgeon) generally wears surgical gloves, which have become slippery from wound fluid, blood and the like, affording little grip.

Profiling the needles so that they may be gripped more tightly is not feasible, as this would be in conflict with the requirement that the surface of the needle must be as smooth as possible in order to allow passage through the skin with the least possible injury.

It is the object of the invention to provide a device of the present kind, facilitating the insertion of a drain into a wound, and especially the passing of a drain through the skin, without accompanying undesirable effects such as causing extra wounds.

To this end the device according to the invention is characterized by a handle which is detachably connectable to the rear end of the needle and which is provided with a central channel for at least partially

receiving the drain. After the drain is connected with the attaching means of the needle, the drain is inserted into and guided through the central channel of the handle until the rear end of the needle is connected with the handle. The needle is then drawn in the usual manner from the side of the wound through the skin to the outside, with the handle providing a large grip surface which is convenient to handle. When the needle has penetrated the skin sufficiently far, the needle is detached from the handle and the needle is drawn through the skin until the frontal end of the drain protrudes through the skin. The handle can be pushed over the drain in the opposite direction and be removed from the wound. Finally, as is customary, the needle and the drain may be disconnected, and the drain may be prepared for use in the conventional manner.

Since the rear end of the needle according to the invention is now provided with a handle, the needle itself may be less long than the conventional needles. This is an important advantage as said needles are generally used only once. A shorter needle produces less waste, resulting in a reduction in costs. The handle may be reused.

In a preferred embodiment according to the invention the rear end of the needle in cross section has a polygonal, for example, hexagonal part, whereas the central channel of the handle debouches into a correspondingly shaped recess for receiving the polygonal part of the needle. To mount the needle in the handle it is merely required to insert the polygonal part of the needle into the correspondingly shaped recess of the handle. This automatically lodges the drain in the central channel of the handle as said central channel is a continuation of the recess provided in the handle.

The polygonal shape of the rear end of the needle and the corresponding recess in the handle have essentially two advantages. For one thing, a non-rotating connection between the needle and the handle is provided, so that by manipulating the handle, the needle, which is generally curved, may be brought into the most ideal position. Also, the polygonal shape facilitates fitting the

needle into the handle, since the two parts always only need to rotate slightly with respect to each other in order for the two corresponding parts to fit together. For instance, if a hexagonal shape is involved, a reciprocal rotation of only 60° will be required in the most unfavourable situation.

Also, it is preferable that the recess formed in the handle has an outer cylindrical part with a diameter that is slightly smaller than the maximum diameter of the inner polygonal part of the recess. In this embodiment the polygonal rear end of the needle must first pass the outer cylindrical part of the recess in order to be able to engage the inner polygonal part of the recess. In this manner, the needle in its final fixed position is locked to prevent unintentional detachment. The difference in diameter between the outer cylindrical part and the inner polygonal part then depends on the desired locking effect. Too great a difference in diameter should be avoided, as otherwise the movement of the polygonal rear part of the needle through the cylindrical part will become very difficult or even impossible.

Further, an embodiment of the device according to the invention is preferred in which the end of the handle to be connected with the needle, tapers. This affords a smooth transition between the rear end of the needle and the frontal end of the handle, whereby unintentional damage to tissues can be prevented.

Finally, an embodiment of the device according to the invention is reported, in which in the wall of the handle two slot openings are provided which connect diametrically to the central channel. Via said slot openings the central channel, over part of its length, is made accessible from the outside of the handle; in this manner the channel can be properly cleaned. In this connection it should be remarked that in general the design of the whole handle is such as to make it easy to clean and sterilize because, as already mentioned above, the handle is generally intended for reuse. For this reason the above-described manner of connecting the handle and the needle

will enjoy preference; however, it is not impossible to use other coupling mechanisms such as bayonet fastenings, ratchet mechanisms, snap fastenings and the like, but these will generally result in devices that are more difficult to clean and sterilize, so that they would probably be considered as disposables.

The material for the manufacture of the handles will be selected with a view to the application. If it is a matter of a reusable handle, the material will have to be resistant to the appropriate cleaning and sterilization methods.

The invention will now be explained in more detail with reference to the drawing, showing an embodiment of the invention according to the invention.

Figure 1 shows a side view of a needle for use in the device according to the invention;

Figure 2 shows a side view of a handle for use in the device according to the invention;

Figure 3 shows a longitudinal section of the handle of Fig. 2;

Figure 4 shows a cross-sectional view of the handle of Fig. 2 according to line IV-IV;

Figure 5 shows a cross-sectional view of the handle of Fig. 2 according to line V-V, and

Figure 6 shows a cross-sectional view of the handle of Fig. 2 according to line VI-VI.

The device according to the invention for inserting a drain into a wound comprises a needle 1 shown in Fig. 1 and a handle 2 shown in Fig. 2. At its frontal end the needle 1 has a sharp point 3 and at its rear end an attaching means 4 for a drain 5, indicated by the dotted line. Conventionally, the attaching means may be a stub provided with a fine thread, over which the end of the drain 5 is clasped.

The rear end of the needle 1 which in cross section is seen to have a hexagonal part 6, directly adjoins to the attaching means 4. Finally, it can be seen that the needle 1, in the conventional manner, is curved.

The handle shown in Fig. 2 in side view and in Fig. 3 as longitudinal section, is substantially shell-shaped with a central channel 7. At one end the central channel debouches into a likewise hexagonally shaped recess 8 and an adjoining cylindrical part 9. The interior shape of the hexagonal recess 8 corresponds to the exterior shape of the hexagonal part 6 of the needle 1. By fitting the hexagonal part 6 of the needle 1 into the hexagonal recess 8 of the handle 2, the needle 1 is detachably connectable with the handle 2.

The inside diameter of the cylindrical part 9 is slightly smaller than the maximum inside diameter of the hexagonal recess 8 (that is to say the distance between two diametrically positioned angular points of the hexagon). Similarly, the diameter of the cylindrical part of the needle 1, immediately adjacent to the hexagonal part 6, is slightly smaller than the maximum outside diameter of said hexagonal part 6. This allows the needle 1 to be fitted tightly into the handle 2. To this end the hexagonal part 6 is pushed with some force through the cylindrical part 9 of the handle 2 until the hexagonal part 6 is admitted in the hexagonal recess 8. The drain 5 then extends through the central channel 7.

As can further be clearly seen from Fig. 2, the handle 2, at the position of the recess 8 and the cylindrical part 9, is shaped to taper. When assembled, this will result in a gradual transition from the needle 1 to the handle 2.

Figs. 2 and 3 finally, show that in its wall the handle 2 is provided with two slot openings 10 and 11 which connect diametrically to the central channel 7. Said slot openings 10 and 11 form a connection between the surroundings and the central channel 7, making said channel easily accessible for cleaning and sterilizing.

The exterior of the handle 2 also has a polygonal, for instance, hexagonal form, providing a good grip on the surface of the handle 2. Of course, other surface profiles are also possible.

When the device according to the invention needs to be used, a drain 5 is first connected to the rear end of the needle 1, in accordance with Fig. 1. Next the drain 5 is pushed via the cylindrical part 9 and the recess 8 into the central channel 7 of the handle 2, far enough for the hexagonal part 6 of the needle 1 to be admitted in the hexagonal recess 8 of the handle 2. Then the handle 2 is taken into the hand and the needle with its sharp point 3 is drawn from the wound through the skin to the outside. When the needle 1 has penetrated the skin sufficiently far, the handle is detached from the rear end of the needle and removed backward over the drain 5. The needle 1 can then be grasped on the outside of the skin and pulled outward so far that the frontal part of the drain 5 is also outside the skin. Finally, the drain 5 is detached from the needle 1 and attached in a manner known in itself to an apparatus (such as a Redon bottle) for draining off wound fluid and the like.

The invention is not limited to the embodiment described above which, within the scope of the invention as specified by the claims, may be varied in many ways.

CLAIMS

1. A device for inserting a drain into a wound with a needle having a sharp frontal end and a rear end which is provided with an attaching means for connecting the drain with the needle, **characterized** by a handle which is detachably connectable to the rear end of the needle and which is provided with a central channel for at least partially receiving the drain.

2. A device according to claim 1, **characterized** in that the rear end of the needle in cross section has a polygonal, for example, hexagonal part, whereas the central channel of the handle debouches into a correspondingly shaped recess for receiving the polygonal part of the needle.

3. A device according to claim 2, **characterized** in that the recess formed in the handle has an outer cylindrical part with a diameter that is slightly smaller than the maximum diameter of the inner polygonal part of the recess.

4. A device according to one of the previous claims, **characterized** in that the end of the handle to be connected with the needle, tapers.

5. A device according to one of the previous claims, **characterized** in that in the wall of the handle two slot openings are provided which connect diametrically to the central channel.

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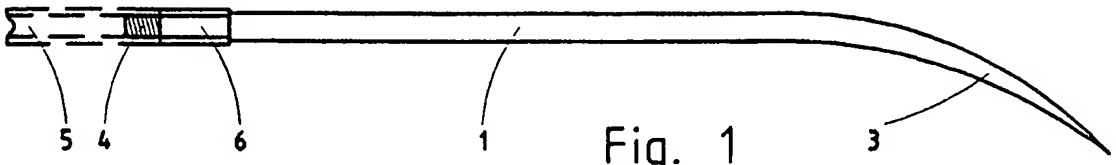

Fig. 1

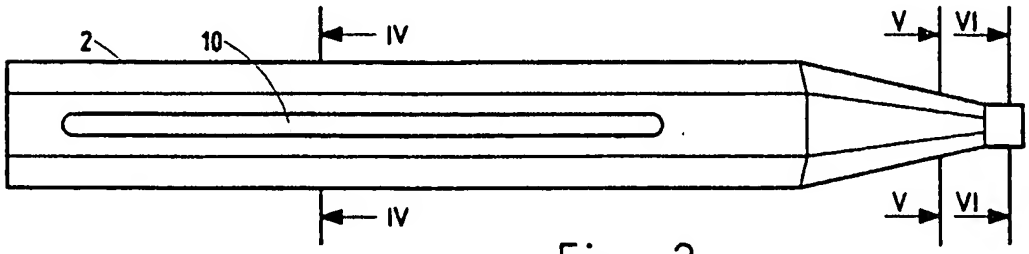

Fig. 2

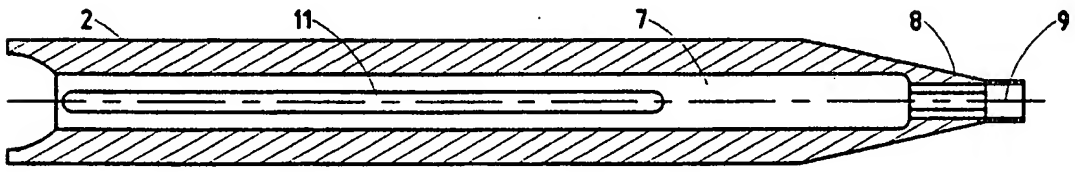

Fig. 3

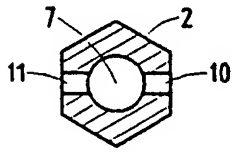

Fig. 4

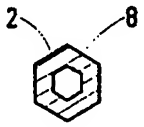

Fig. 5

Fig. 6

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61M27/00 A61M25/01 A61B17/34

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61M A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 44 16 976 A (BUCHNER) 23 November 1995 see the whole document	1
A	US 5 137 517 A (LONEY) 11 August 1992 see abstract; figures	1,4,5
P,A	EP 0 807 447 A (CORDIS) 19 November 1997 see column 2, line 35 - column 4, line 18; figures	1,3,5
A	EP 0 623 355 A (MAUK) 9 November 1994 see abstract; figures	1
A	NL 7 216 160 A (STERIMED) 1 June 1973 see claims 1-4; figures	1

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4416976 A	23-11-95	NONE	
US 5137517 A	11-08-92	NONE	
EP 807447 A	19-11-97	NL 1003135 C	18-11-97
		CA 2205251 A	15-11-97
EP 623355 A	09-11-94	DE 4307658 A	15-09-94
NL 7216160 A	01-06-73	BE 790777 A	15-02-73
		CH 541334 A	31-10-73
		FR 2161950 A	13-07-73